

Claims

1. Thermosetting coating compositions comprising as binder a mixture of a carboxyl group containing polyester, a glycidyl group containing acrylic copolymer and  
5 a curing agent having functional groups reactable with the polyester carboxylic acid groups, characterised in that 100 parts by weight of this binder comprises:
- 40.0 to 90.0 parts by weight of a carboxyl functional polyester consisting of a carboxyl functional amorphous polyester composed of from 50 to 100% mole  
10 of terephthalic acid and from 50 to 0% mole of one or more aliphatic, cycloaliphatic or aromatic polyacid other than terephthalic acid, referring to the polyacid constituents, and of from 50 to 100% mole of neopentyl glycol or 2-butyl-2-ethyl-1,3-propanediol or their mixtures and from 0 to 50% mole of another aliphatic and/or cycloaliphatic polyol, referring to the polyol constituents;
  - 15 - 10.0 to 60.0 parts by weight of a glycidyl group containing acrylic copolymer having a number average molecular weight of at least 5000 and composed of 10 to 90% mole of a glycidyl group containing monomer and from 90 to 10% mole of other monomers copolymerisable with the glycidyl group containing monomers; and
  - 20 - 0.5 to 15.0 parts by weight of a curing agent having functional groups reactable with the polyester's carboxylic acid groups.
2. Composition according to claim 1, characterised in that the aliphatic, cycloaliphatic or aromatic polyacid other than terephthalic acid is selected from the group comprising isophthalic acid, fumaric acid, maleic acid, phthalic anhydride, 1,4-  
25 cyclohexanedicarboxylic acid, 1,3-cyclohexanedicarboxylic acid, 1,2-cyclohexanedicarboxylic acid, succinic acid, adipic acid, glutaric acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, 1,12-dodecanedioic acid, trimellitic acid, pyromellitic acid, or the corresponding anhydrides, and the other aliphatic or cycloaliphatic polyol is selected from ethylene glycol, propylene glycol, 1,4-butanediol, 1,6-hexanediol, 1,4-  
30 cyclohexanediol, 1,4-cyclohexanedimethanol, 2-methyl-1,3-propanediol, 2-butyl-2-ethyl-1,3-propanediol, hydrogenated Bisphenol A, hydroxypivalate of neopentyl glycol, trimethylolpropane, ditrimethylolpropane, pentaerythritol.
3. Composition according to any of claims 1 to 2, characterised in that the polyacid constituent of the carboxyl functional amorphous polyester comprises from  
35 50 to 90 % mole % of terephthalic acid or isophthalic acid or their mixtures and from 50

to 10 % mole of an aliphatic, cycloaliphatic or aromatic polyacid other than terephthalic acid or isophthalic acid.

4. Composition according to any of claims 1 to 2, characterised in that the polyacid constituent of the carboxyl functional amorphous polyester comprises from  
5 50 to 90 % mole % of terephthalic acid and from 10 to 50 % mole of an aliphatic, cycloaliphatic or aromatic polyacid other than terephthalic acid or isophthalic acid.

5. Composition according to any of claims 1 to 2, characterised in that the polyacid constituent of the carboxyl functional amorphous polyester comprises from  
10 50 to 90 % mole % of terephthalic acid, from 2 to 30 % mole of isophthalic acid and from 2 to 30 % mole of an aliphatic, cycloaliphatic or aromatic polyacid other than terephthalic acid or isophthalic acid.

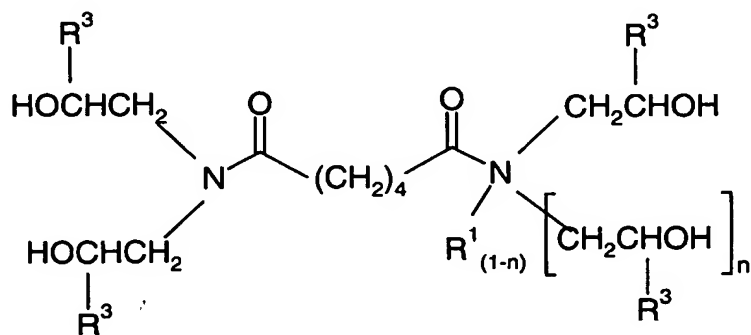
6. Composition according to any of claims 1 to 5, characterised in that the carboxyl functional amorphous polyester has following properties:

- 15 - an acid number from 15 to 100 mg KOH/g and preferably from 30 to 70 mg KOH/g;
- a number averaged molecular weight ranging from 1100 to 15000 and preferably from 1600 to 8500;
- a glass transition temperature (Tg) from 40 to 80°C;
- an ICI (cone/plate) viscosity at 200°C ranging from 5 to 15000 mPa.s.

20 7. Composition according to any of claims 1 to 6, characterised in that the glycidyl group containing monomer is selected from glycidyl acrylate, glycidyl methacrylate, methyl glycidyl methacrylate, methyl glycidyl acrylate, 3,4-epoxycyclohexylmethyl (meth)acrylate and acrylic glycidyl ether, used singly or in combination of two or more, and the other monomers copolymerisable with the glycidyl group  
25 containing monomers is selected from:

- 40 to 100 mole percentage of acrylic or methacrylic ester monomers such as methyl acrylate, ethyl acrylate, n-propyl acrylate, isopropyl acrylate, n-butyl acrylate, n-decyl acrylate, methyl methacrylate, ethyl methacrylate, n-propyl methacrylate, isopropyl methacrylate, n-butyl methacrylate, isobutyl  
30 methacrylate, n-amyl methacrylate, n-hexyl methacrylate, isoamyl methacrylate, allyl methacrylate, sec-butyl methacrylate, tert-butyl methacrylate, 2-ethylbutyl methacrylate, cinnamyl methacrylate, crotyl methacrylate, cyclohexyl methacrylate, cyclopentyl methacrylate, methallyl methacrylate, n-octyl methacrylate, 2-ethylhexyl methacrylate, 2-phenylethyl  
35 methacrylate and phenyl methacrylate, and their mixtures;

- 0 to 60 mole percentage of other ethylenically unsaturated copolymerisable monomers such as styrene, alkyl-substituted styrenes and chloro-substituted styrenes, acrylonitrile, vinyl chloride and vinylidene fluoride and vinyl acetate, and their mixtures.
- 5 8. Composition according to any of claims 1 to 7, characterised in that the glycidyl group containing acrylic copolymer has following properties:
- a number averaged molecular weight ranging from 5000 to 25000 and preferably from 10000 to 20000
  - a glass transition temperature (T<sub>g</sub>) from 40 to 85°C, measured by Differential
  - 10 Scanning Calorimetry (DSC), according to ASTM D3418 with a heating gradient of 20°C per minute
  - an ICI (cone/plate) viscosity determined by the ICI method at 200°C ranging from 60 to 50000 mPa.s
9. Composition according to any of claims 1 to 8, characterised in that the curing
- 15 agent is a polyepoxy compound and/or a β-hydroxyalkylamide containing compound.
10. Composition according to any of claims 1 to 9, characterised in that the curing agent is a β-hydroxyalkylamide according to Formula II



Formula II

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wherein n is from 0.2 to 1, R<sup>1</sup> is selected from hydrogen and alkyl groups with 1 to 5 carbon atoms and R<sup>3</sup> is hydrogen or methyl.

11. Composition according to any of claims 1 to 10, characterised in that it
- 25 comprises a binder which, for 100.0 parts by weight of binder, consists of
- 60.0 to 80.0 parts by weight of the carboxyl functionalised amorphous polyester;

- 20.0 to 50.0 parts by weight of the glycidyl group containing acrylic copolymer;  
and
  - 2.3 to 12.0 parts by weight of a  $\beta$ -hydroxyalkylamide curing agent.
12. Composition according to any of claims 1 to 11 containing:
- 5
- one or more UV-light absorbers and/or hindered amine light stabilisers;
  - one or more flow control agent;
  - one or more degassing agent; and/or
  - one or more pigment, dye and/or filler.